

**SECTION 3 - AREA OF REVIEW AND CORRECTIVE ACTION PLAN**

**TABLE OF CONTENTS**

Facility Information .....1

Computational Modeling.....1

Area of Review Discussion.....2

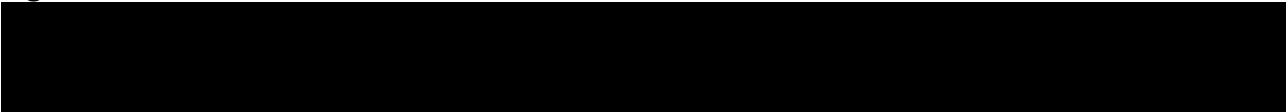
    Area of Review Results.....6

Corrective Action Plan and Schedule .....6

Area of Review Reevaluation Plan and Schedule .....7

    Proposed Reevaluation Cycle .....7

**Figures**



**Tables**



Table 3- 2: Corrective Action Plan .....6

Table 3- 3: Triggers for AOR Reevaluations .....7

## Facility Information

Facility name: **Hackberry Carbon Sequestration, LLC**

[REDACTED]

[REDACTED]

[REDACTED]

Location: 1500 Post Oak Blvd, Suite 1000  
Houston, TX 77056

## Computational Modeling

Model Name: **GEM**

Model Authors/Institution: Computer Modeling Group, Ltd.

Description of model: Equation-of-State (EoS) reservoir simulator for compositional, chemical, and unconventional reservoir modeling.

[REDACTED]

[REDACTED]

[REDACTED]



### **Area of Review Discussion**

Statewide Order 29-N-6, **§615.B** [EPA **40 CFR §146.84**] requires that an area of review (AOR) be conducted for a Class VI carbon sequestration well application. This AOR is defined as the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.

The AOR is conducted with three (3) primary purposes in mind. These are: CO<sub>2</sub>

1. Identification of any subsurface geological features which may influence the ability to store sequestered gases for an indefinite length of time
2. Identification of any artificial penetrations or manmade structures which may influence the ability to store sequestered gases for an indefinite length of time
3. Identification of pore space rights impacted by the extent of the injection plume over the modeled time period

In accordance with Statewide Order and Federal EPA requirements, Hackberry Carbon Sequestration will reevaluate the AOR at each of the following intervals:

- Minimum frequency of five years
- Detection of a significant change in the plume
- As otherwise warranted by routine monitoring or operational conditions

Wells identified that require corrective action within the reevaluated AOR will be addressed with an amended AOR and corrective action plan that will be submitted to the EPA UIC Program Director for approval. All amendments and corrective plans will be approved, incorporated into the permit, and will be subject to permit modification requirements per **§144.39**.

Alternatively, wells that do not require AOR amendments or corrective action will demonstrate to the EPA UIC Program Director that no changes are needed through monitoring data support and modeling results. All modeling inputs and data used to support AOR reevaluations will be retained for 10 years.

An unfortunate impact to carbon sequestration projects, resulting from qualifying carbon injection wells as storage wells instead of disposal wells, is that pore space rights now become of paramount importance in the evaluation of a project's potential. This impact could end up being so adverse that it could possibly prevent a project from being economically viable.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



This plume extent was digitized from the GEM output and imported into ArcGIS to be utilized as the defined area of influence from which the AOR for the Hackberry Carbon Sequestration Well No. 001 was performed. Per the requirements of ***§615.B.1 [§146.84]***, a review was conducted to determine if there were any artificial penetrations or other features which may endanger the lowermost underground sources of drinking water (USDW) as a result of injection activity or operations. This review consisted of creating maps depicting the area of influence and identifying any manmade structures found within that area of review. Any artificial penetrations or other artifacts were then evaluated for depth of completion, construction details, and/or plugging and abandonment practices utilized to determine if said penetrations could possibly affect the containment integrity of the storage formation(s).



[REDACTED]

[REDACTED]

[REDACTED]

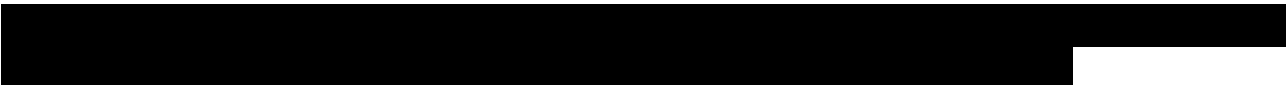
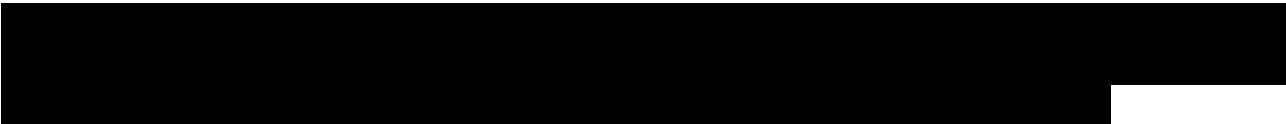
[REDACTED]

[REDACTED]

[REDACTED]



**Area of Review Results**



**Corrective Action Plan and Schedule**

Well Name / Location	Planned Corrective Action Method	Planned Date of Corrective Action	Notes / Comments
NONE	NONE	NONE	NONE

*Table 3- 2: Corrective Action Plan*

## Area of Review Reevaluation Plan and Schedule

### Proposed Reevaluation Cycle

Hackberry Carbon Sequestration, LLC will reevaluate the area of review at a minimum of every five years, per SWO 29-N-6 **§615.B.2.b.i** [EPA 40 CFR **§146.84(b)(2)(i)**]. The plume migration however, will be evaluated annually for the first five (5) years after commencing injection operations and then, operations-permitting, every five (5) years thereafter. The purpose of the annual survey is to confirm the validity of the plume model as compared to actual, empirical results.

As previously stated, due to the classification of carbon sequestration wells as storage wells, it will be important, operationally, to maintain a firm understanding of the movement of the injectate plume within the reservoir. [REDACTED]

[REDACTED] Notwithstanding this relationship and at a minimum, the survey will be performed at least once every five (5) years from the commencement of injection operations.

[REDACTED]

Table 3-3 lists some of the possible triggers for an AOR reevaluation.

Reevaluation Trigger	Measure to be Taken	Schedule for Reevaluation
<b>SWO 29-N-6 §615.B.2.b.i</b> <b>40 CFR 146.84(b)(2)(i)</b>	Reevaluate the AOR as required by statute	At least once every five (5) years
Annual plume migration survey identifies a greater extent than modeled	Re-run the reservoir plume model with new data Reevaluate the AOR	Within one (1) month of detection

*Table 3- 3: Triggers for AOR Reevaluations*

Annual plume migration survey identifies the plume direction is different than modeled	Re-run the reservoir plume model with new data  Reevaluate the AOR	Within one (1) month of detection
<u>Operational Change</u> : Injection rate increases to a rate greater than that modeled	Re-run the reservoir plume model with new data  If plume increases in extents, reevaluate the AOR	Within one (1) month of detection
<u>Operational Change</u> : Injectate composition changes to a new mixture	Re-run the reservoir plume model with new data  If plume increases in extents, reevaluate the AOR	Within one (1) month of detection
New site characterization data	Re-run the reservoir plume model with new data  If plume increases in extents, reevaluate the AOR	Within one (1) month of detection
New operations being brought online within or near the plume extents	Re-run the reservoir plume model with new data  If plume increases in shape or extents, reevaluate the AOR	Within one (1) month of detection
Seismic event or other emergency	Perform a plume migration survey  If plume increases in shape or extents, reevaluate the AOR	Within one (1) month of detection

Table 3- 3: Triggers for AOR Reevaluations, Continued